After-LIFE Plan

myBUILDINGisGREEN

LIFE17 CCA/ES/000088

2024 - 2028

my building is green
A LIFE PROJECT

CSIC · REAL JARDÍN BOTÁNICO · Instituto de Ciencias de la Construcción EDUARDO TORROJA · CARTIF · DIPUTACIÓN DE BADAJOZ · Porto. · ALENTEJO CENTRAL

ÍNDICE

LISTA DE ABREVIATURAS

ANCV	Asociación Nacional de Cubiertas Verdes (National Association of Green Roofs)
ASESCUVE	Asociación Española de Cubiertas Verdes y Ajardinamientos Verticales (Spanish Association of Green Roofs and Vertical Landscaping)
CEIP	Centro de Educación Infantil y Primaria (Infant and Primary Education Centre)
CIMAC	Intermunicipal Community of Central Alentejo
COSC	Online Catalogue of Construction Solutions
CSIC	Consejo Superior de Investigaciones Científicas (Spanish National Research Center)
CTE	Código Técnico de la Edificación (Technical Building Code)
DIPBA	Diputación de Badajoz (Provincial Council of Badajoz)
EB1	Escuela Básica de Infantil y Primaria (Basic School for Infants and Primary Education)
EU	European Union
FEMP	Federación Española de Municipios y Provincias (Spanish Federation of Municipalities and Provinces)
GBCe	Green Building Council España
IDAE	Instituto para la Diversificación y Ahorro de la Energía (Institute for Energy Diversification and Saving)
IETcc-CSIC	Eduardo Torroja Institute of Construction Science
LIFE-mBiG	LIFE-myBUILDINGisGREEN
MP	Municipality of Porto
NBS	Nature Based Solutions
RITE	Reglamento de Instalaciones Térmica en los Edificios (Regulation on thermal installations in buildings)
RJB-CSIC	Real Jardín Botánico (Royal Botanical Garden, CSIC)

1. PROJECT DATA

Locations	Évora (Alentejo Central, Portugal) Oporto (Norte, Portugal) Solana de los Barros (Extremadura, España)
Start date	01/09/2018
End date	29/02/2024
Duration	66 meses
Total budget	2.854.102 €
EU contribution	1.697.369 €
(%) of eligible costs	59,99 %
Coordinating entity	Consejo Superior de Investigaciones Científicas
Beneficiaries	Fundación CARTIF, Diputación de Badajoz, Municipio de Oporto Comunidad Intermunicipal del Alentejo Central
Contacto person	Miguel Vega
E-mail	miguel.vega@rjb.csic.es
Project website	https://life-mybuildingisgreen.eu/en/home/

Any queries regarding this report should be addressed to:

Miguel Vega
General Project Coordinator

Real Jardín Botánico (RJB-CSIC)
Calle Claudio Moyano, 1. 28014 Madrid, España
Tel: +34 914 203 017
E-mail miguel.vega@rjb.csic.es

Document date: Feb 2024

2. THE PROJECT

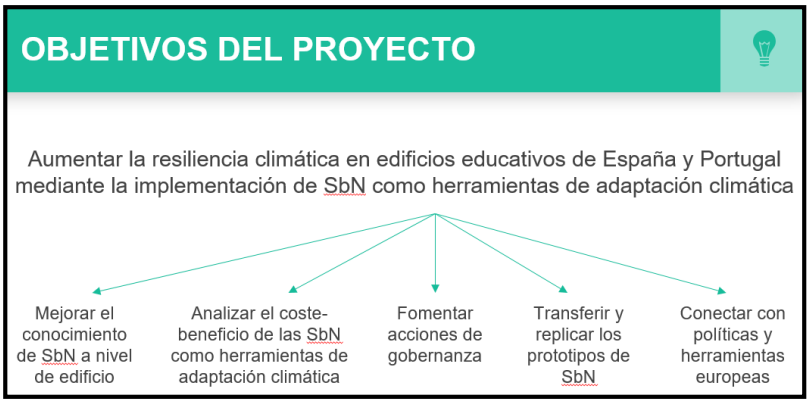
Summary and objectives

Climate change is one of the most serious environmental, social and economic challenges facing the world. Educational buildings in Europe will face many challenges in the coming decades, such as the complete renovation of buildings that have suffered structural failure over time and where insulation measures have been largely ignored. In addition, climate change will add to these pressures through a range of impacts such as heat waves or changes in annual and seasonal rainfall patterns. This can affect the health and well-being of children, who are the main users of these buildings.

The LIFE-myBUILDINGisGREEN project aims to address the effects of climate change in terms of rising temperatures in school buildings, which have been exacerbated in recent years by successive heat waves across Europe, but with more adverse effects in the southern region of the continent. As a result, educational and social care facilities in southern Europe experience indoor temperatures above 32°C for several months of the year, making these buildings very difficult to live in.

LIFE-mBiG is a project developed by a group of partners from the Iberian Peninsula, co-funded by the LIFE programme of the European Union, whose objective is the design, development and testing of innovative NBS (prototypes) to improve the bioclimatic comfort of educational buildings in order to increase the well-being of the users of these buildings.

The project consortium is led by the Consejo Superior de Investigaciones Científicas through the Real Jardín Botánico, with technical support from the Instituto de Ciencias de la Construcción Eduardo Torroja. Beneficiary partners include the CARTIF technological centre, the Provincial Council of Badajoz, the Intermunicipal Community of Central Alentejo and the Municipality of Porto.



Metodology

In three primary schools in Spain (CEIP Gabriela Mistral, Solana de los Barros) and Portugal (EB1 Horta das Figueiras, Évora and EB1 Falcão, Porto), the LIFE-myBUILDINGisGREEN project designed, implemented and tested several NBS to minimise climate impacts. The proposed NBS consisted of a series of green roofs, green facades and other shading and water harvesting NBS designed to (i) keep indoor temperatures low during hot periods and thus minimise energy use for cooling, (ii) provide shade and (iii) improve water retention around the buildings by minimising rainwater run-off. At CEIP Gabriela Mistral, a water harvesting system was also installed in conjunction with the installation of two of the green roofs. The water collected by this system is reused to irrigate the implemented NBS and the school's green areas. To complement the effect of these NBS, more trees have been planted in the outdoor areas and an automatic ventilation system has been installed to open and close the school's windows during the night and in the morning to cool the building and reduce CO_2 levels. A permeable paving was also installed, allowing vegetation to grow on its surface and facilitating the infiltration of water into the ground, reducing the amount of water entering the sewerage system. At the Porto school, the intervention was also linked to a roof water collection system that feeds a pond next to the Horta Urbana da Oliveira. In this school, the intervention was also linked to the installation of photovoltaic panels (in a system linked to green roofs), so that the school becomes energy self-sufficient.

In addition to these physical actions on the ground, local and regional authorities with competences in climate change and green infrastructure were involved in capacity building to enable the transferability of the implemented NBS. To this end, visits were organised to raise awareness of the NBS among neighbours in the schools' catchment area, as well as the educational community in the surrounding towns and/or neighbourhoods. A series of demonstration workshops were also organised to show the work carried out to experts and municipal technicians, with a view to possible future replication in other types of buildings. In order to reach a wider audience, a free online course was also developed on the possible NBS that can be used to adapt buildings to climate change, including a summary of the experience gained in the three pilot buildings in Portugal and Spain and an outline of the monitoring system of indicators that measure the effectiveness of the implemented NBS, where the first results obtained were shown. In addition, numerous meetings were held with different stakeholders involved in the adaptation of buildings to climate change in both countries, from the local to the national level, such as the staff of the Technical Building Code, members of the Spanish Climate Change Office, municipal and regional representatives from Spain and Portugal, etc., to discuss the possibilities of transferring the applied NBS to other contexts. In Porto, the experience of the

LIFE-myBUILDINGisGREEN project inspired the introduction of the NBS in the Porto Environmental Index. This is a new municipal regulation in the making (foreseen in the Municipal Master Plan 2021) that aims to encourage urban developers to incorporate BDS in their projects through fiscal and construction benefits.

Figure 1. One of the Green roofs implemented by LIFE-mBiG (mBiGTray prototype).

3. ACTIONS AND RESULTS

Actions

A. Preparatory actions

A.1 Information gathering and design of technical criteria for the selection of pilot buildings

A methodology was developed to identify and select technical criteria to facilitate the selection of pilot buildings for the project. In addition, land use maps and replicable reference models were developed for the selection of buildings.

A.2 Design of projects for the application of nature-based prototypes in buildings

Information related to NBS, their application as climate adaptation tools and their effectiveness (investment/benefit) was reviewed in order to obtain an updated documentary basis for the elaboration and design of the technical projects using NBS.

C. Implementation actions

C.1 Elaboration and drafting of the baseline for buildings

The environmental, social and economic challenges to be addressed by the actions proposed in the project, the indicators that would measure the impact of the actions and the metrics considered appropriate for their evaluation have been identified.

A study was carried out to define the baseline of the buildings through the installation of humidity and temperature sensors, mini-weather stations in the pilot and mirror buildings. A schedule for noise, thermal imaging and radon gas measurements was also defined.

C.2 Implementation of the NBS in the pilot buildings. Execution of the works

For the implementation of this action, an analysis and selection of indigenous and suitable plant species for use in the implemented NBS, the creation of sustainable roofs and bioclimatic roofs by means of a novel system of pots or containers that are easy to integrate and compatible with the inverted cover gravel were carried out, the implementation of sustainable and efficient green spaces on the exterior of the buildings, the development of action plans for the implementation of induced natural ventilation formulas and seasonal shading structures, and the creation of permeable surfaces that allow the proliferation of natural vegetation in car parks and common areas of the buildings.

The implemented NBS were used for the first time in education centres to evaluate their impact as tools for climate adaptation and improving well-being in buildings.

C.3 Monitoring and evaluation of BSS as climate adaptation measures in the pilot buildings

The monitoring of the established variables was carried out for 1.5 years in the Spanish school, 0.5 years in the Porto school and could not be carried out in the Évora school, so this After-LIFE Plan is very important to complete the monitoring process in all the pilot buildings and to evaluate the effectiveness of the implemented NBS. Moreover, the monitoring process will continue until the end of the After-LIFE Plan, as the vegetation used needs several years to reach its optimal state and to know the real effect of the NBS.

The information collected will be compared with the baseline values established in Action C.1. In addition, surveys have been carried out with vulnerable groups (children, the elderly and the disabled) to assess the state of well-being after the interventions have been carried out.

C.4 Governance for active adaptation to climate change in educational buildings

The project has worked to promote governance actions, i.e. agreements, commitments or support obtained from administrations at different levels and related entities that allow or facilitate the transferability of the project's NBS to other contexts.

In the framework of this action, a documentation platform has been created with all the information on the meetings held and the governance tools addressed, as well as documentation with the governance tools identified and the progress achieved by the project in the application of the governance tools identified.

C.5 Mainstreaming and transferability at local, national and European level

This action addresses the transferability of the project at a general level. This objective is closely related to the governance objective of the previous action, but also includes the transferability of the NBS to technical profiles that may be interested in using them in the future, to the educational community that may want to teach about the benefits of the NBS in educational centres, or to professionals from other European countries with similar climate problems to those present in Portugal and Spain.

To achieve this objective, the project has developed an NBS replicability plan and a series of replicability outputs, such as the design of exemplary projects in schools in different European countries.

At the level of in-situ transferability, a series of events called "demonstration workshops" were organised. These workshops consisted of a technical explanation of the NBS implemented in the pilot buildings. The leaders of each building project were involved in the organisation and development of these workshops, which were aimed at political staff, technical profiles and the educational community, with a view to the possible transferability of the solutions in the future.

C.6 Action plan to strengthen the adaptive capacity of existing and future buildings

In the framework of this action, work was carried out on the preparation of the LIFE-mBiG Climate Adaptation Package, which consists of a series of documents that constitute a training resource to be used later with different audiences, with priority being given to its use by trainers of early childhood and primary education centres or environmental education and more technical profiles.

In addition, a database of people and institutions with key competences has been created to strengthen the capacity of trainers working in the field of education for sustainability, including adaptation to climate change in cities, and technical staff working in the design, implementation and/or maintenance of green infrastructure.

D. Monitoring and follow-up actions

D.1 Monitoring the impact of project indicators

This is the monitoring of the effects produced by the project performance and the effectiveness of the technical measures to measure the impact of the project on the target environmental problem. Regular evaluation was ensured by allowing both the reporting of indicators and the establishment of the project baseline for effective comparative monitoring of the progress and

results of all actions.

D.2 Monitoring the socio-economic impact of project actions

In order to quantify and assess the impact of the potential socio-economic benefits, a number of indicators and potential impacts were selected and evaluated and monitored throughout the project to provide a comprehensive overview of the consequences of the technical measures implemented in the buildings.

D.3 Evaluation, control and monitoring of project performance indicators LIFE KPI web tool

The performance indicators of the LIFE programme and the indicators measuring the achievement of each of the project actions have been taken into account. This measure helps to report on the results achieved and/or deviations from the initial project estimates. Information was provided on the results achieved and their social, economic and environmental impact.

E. Communication and dissemination actions

E.1 Project communication and dissemination plan

As part of this action, a communication strategy has been drawn up to structure the communication and dissemination activities of the project, such as the creation of the website and communication channels, their use and management, the publication of press releases in the institutional media of the beneficiary organisations of the project, the transmission of information related to the project in digital press, TV, radio and specific media on the subject of the project, as well as the organisation of meetings to explore opportunities for cooperation (networking) with other projects and/or interested parties.

E.2 Communication activities for target groups

These activities focused on the organisation of events such as conferences, congresses, webinars, workshops, etc. aimed at the target audience of the project. An online course has also been developed in the three project languages, which addresses the issues of climate change in relation to thermal comfort in buildings, presents a range of possible NBS available to improve the well-being of the users of these buildings, shares the experience of the LIFE-mBiG project in the three pilot buildings and concludes with the results achieved by the project up to the date of publication.

E.3 Knowledge transfer on NBS as climate adaptation solutions

The final communication activity focused on the transfer of the knowledge generated in LIFE-mBiG to the EU Climate-Adapt platform, where the project was published as a case study. This case study served as a model for publishing similar information on other related content platforms at national level in Spain and Portugal, and also at European level.

F. Project coordination and management actions

F.1 General coordination

This action structured the administrative, financial and technical coordination tasks of the project to ensure its proper implementation, formalising the functions of each beneficiary entity through the signature of various memoranda of understanding between the coordinating entity and the other entities.

F.2 Final audit

The project intended to carry out an external and internal audit for the financial supervision of the project, its income and expenditure, the legality of the actions and to verify its full compliance with the rules of the LIFE 2014-2020 programme.

In the end, this action was not carried out as it was subsequently cancelled for projects with funding of less than EUR 750 000 per beneficiary, as is the case for LIFE-mBiG.

F.3 After-LIFE

This is the action for which this deliverable provides a summary of the project, an assessment of the situation after the end of the project and a strategy for replicating the project in public education and social services buildings in the four EU climate risk regions. The objectives and a brief summary of the contents of this plan are included in section "4. After-LIFE Plan" of this document.

Results

Impact assessment of NBS implementation is essential to ensure that these solutions are effective, sustainable and beneficial at the environmental, social and economic levels. Impact assessment at these three levels helps to determine their effectiveness in solving specific problems and to ensure their efficiency. In turn, the impact assessment of the NBS supports replication by providing critical information to decision-makers, enabling them to make evidence-based decisions and prioritise solutions that are beneficial to both the environment and society.

The impact assessment of the NBS prototypes implemented in the LIFE-mBiG project follows the methodology proposed in Deliverable *C1. Baseline report of the pilot buildings*. For this purpose, a monitoring plan has been established and a set of indicators has been selected based on the main environmental and social challenges, using the European project EKPLISE as a reference. A total of 22 indicators have been selected to monitor the impact of the actions in the three pilot buildings of the project.

The implementation of the NBS prototypes in the three pilot buildings focused on improving the thermal comfort of school users, increasing the green area in a sustainable way, reducing the carbon footprint, improving water management in the buildings, restoring and promoting local biodiversity in the urban environment, and raising awareness of the value of nature and the ecosystem services it provides.

Below is a brief summary of the impact of these actions in each of the pilot buildings. Full information on the results of the project can be found in Deliverable *C3. Report and results of the monitoring and evaluation of the impacts proposed in the pilot buildings*.

EB1 Horta das Figueiras (Évora, Portugal)

The baseline monitoring period ran from May 2019 to December 2023. The prototype implementation works started on 24 April 2023 and ended in February 2024. As this document was drafted before the end of the works, the post-implementation monitoring period cannot be included and the impacts cannot be calculated at this stage. The After-LIFE plan foresees the continuation of the monitoring process after the end of the work on this pilot building.

The measures carried out have mainly affected the roofs and facades of the building, paving, vegetation and outdoor spaces.

- Installation of a green roof with the mBiGWTray prototype on the four roofs. A total of 260 bag units have been installed to form the green roof, with a total area of 256.88 m2, taking into account that the total green area is half: 128.44 m^2.

Figure 2. mBiGTray prototype installed in the school EB1 Horta das Figueiras

- Installation of two types of green façade: mBiGToldo and mBiGFAC on different façades of the building, covering a total surface area of 103.07 m^2.

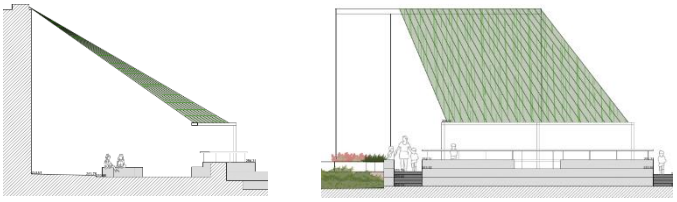


Figure 3. Profile of the mBiGFAC prototype.

- Outside, three types of intervention were carried out: external wooden structure to protect against rain, new vegetation in existing green areas (188 m^2) and new vegetation areas with a surface of 179 m^2, and permeable paving covering 366 m^2.

During the After-LIFE period, CIMAC, with the support of CSIC and CARTIF, will be responsible for recording and evaluating the impact of the NBS implemented in the school. The production of graphs based on the data collected over the coming years (2024-2026 in detail and 2026-2028 on an ad hoc basis) will be used to assess the impact of the roof and façade solutions.

EB1 Falcão (Oporto, Portugal)

The baseline monitoring period runs from May 2019 to October 2022. The post-BSN implementation period runs from March 2023 to October 2023. Work on the implementation of the prototypes started on 10 October 2022 and ended on 27 February 2023, so the monitoring period after the installation of the NBS prototypes is short.

The measures implemented mainly concerned the roofs and façades of the building, paving, vegetation and outdoor spaces.

- Installation of three types of green roofs (mBiGSECAR, mBiGBioSol and mBiGUL), achieving a total of 663 m^2 of green roofs and improving their accessibility.

- The mBiGFAC prototype was installed on the inner south façade, with a total green façade area of **34.2 m^2**.
- In the outdoor area, the mBiGPond solution was implemented, which is located in the orchards of the plot next to the school and has a surface area of approximately 28 m^2 (maximum longitudinal radius of 7 m and maximum transverse radius of 4 m). It has a maximum depth of 0.9 m.

With regard to the impact values of the NBS on the pilot building, the following results have already been obtained:

- Roof temperature reduced by 5.4 ^{o}C after NBS installation.

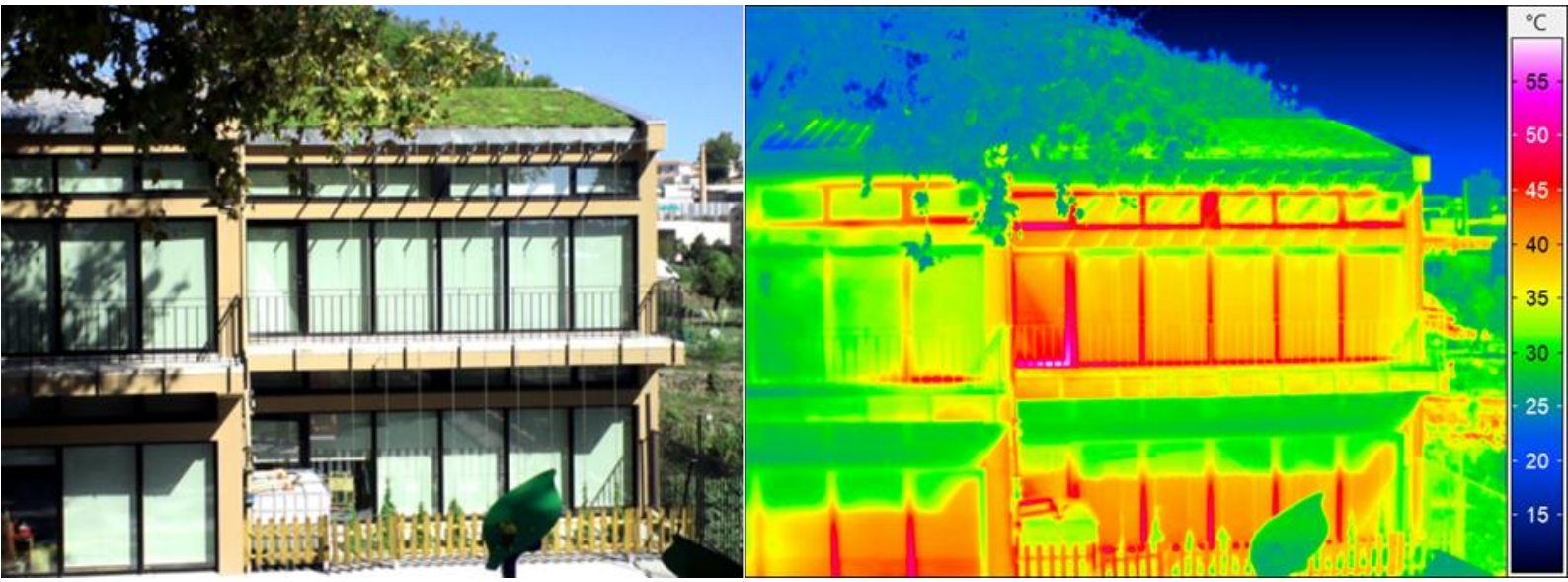


Figure 4. Surface temperatures, EB1 Mello Falcão (*expost*)

- Rainwater runoff loss was reduced from 30% to 3.74% after the installation of the NBS.
- Biodiversity sampling for the baseline revealed 69 species, which increased to 96 immediately after installation of the NBS. The highest animal diversity is among flying insects, mainly flies, mosquitoes and small wasps (hymenoptera), but there are few detritivorous arthropods, such as some springtails, but only one *Armadillidium*, which will become more abundant as habitat quality improves. More conclusive results will require further sampling in subsequent years, especially the next sampling scheduled for spring 2024.
- The effect of the NBS on noise reduction is still unclear and further measurements are needed, as sometimes noise decreases after installation of the NBS, and sometimes the opposite occurs.

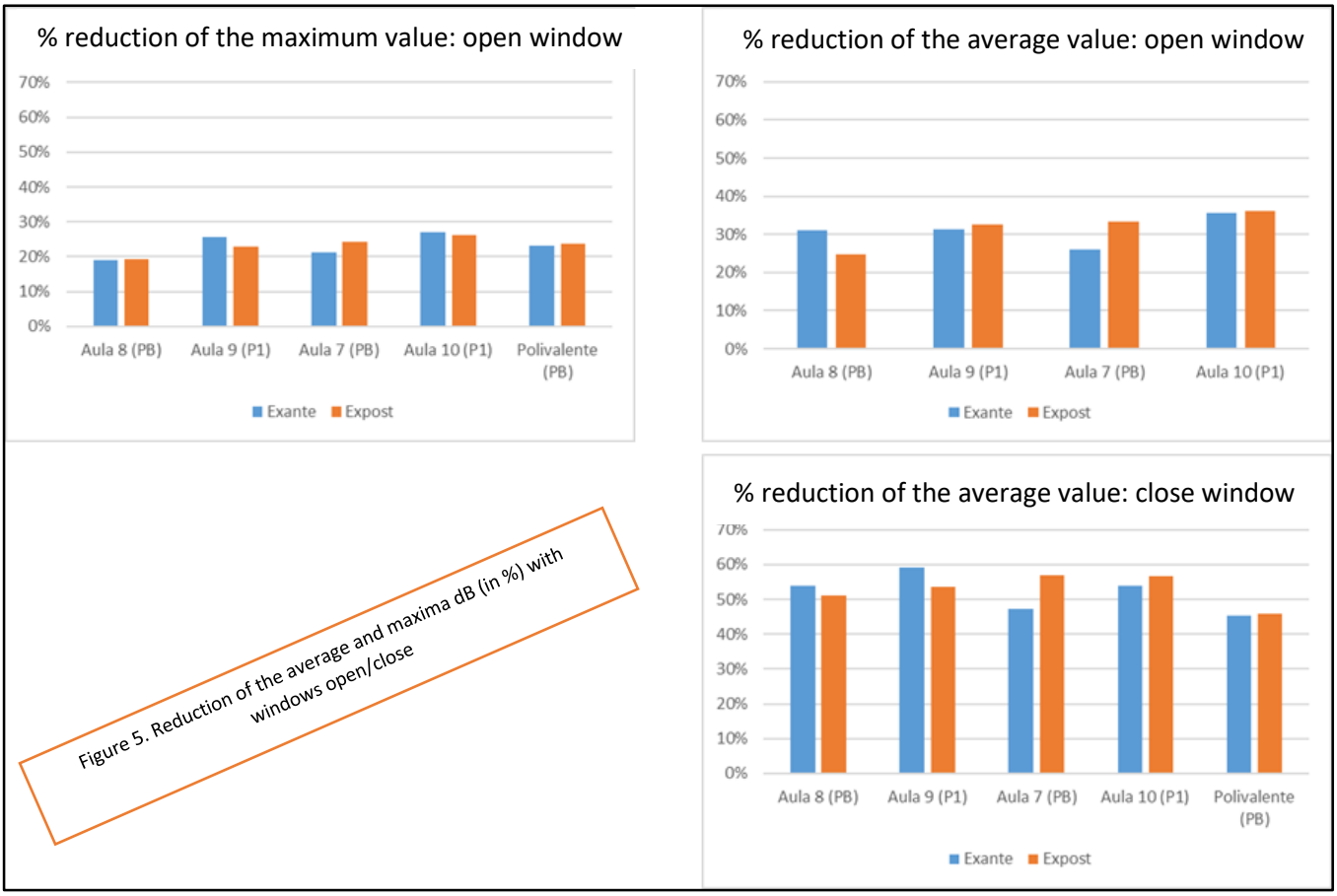


Figure 5. Reduction of the average and maxima dB (in %) with windows open/close

- There are currently no formal agreements, but the municipality of Porto is working on a municipal regulation (called the Porto Environmental Index) to support the implementation of NBS in private buildings.

Due to the short time after the completion of the NBS installation in Porto, a large number of indicators could not be measured, or were insufficiently measured. Two years of sampling in the building after the end of the project are needed to get an initial picture of the environmental, economic and social impact of the NBS installation, and at least another three years of random sampling to get more conclusive data.

During the After-LIFE period, MP, with the support of CSIC and CARTIF, will be responsible for recording and evaluating the impact of the NBS installed in the school. Graphs will be produced from the data collected over the next few years (2024-2026 in detail and 2026-2028 on an ad hoc basis) to assess the impact of the roof and façade solutions.

CEIP Gabriela Mistral (Solana de los Barros, España)

The baseline monitoring period run from May 2019 to December 2021. The post-NBS implementation period run from January 2022 to October 2023. Work on the installation of the prototypes started in May 2021 and was completed in December 2021.

The measures implemented mainly concerned the roofs and façades of the Annex building, paving, vegetation and outdoor spaces.

- Installation of three types of green roofs (mBiGCUVE-1, mBiGCUVE-2 and mBiGCUVE-SUS), creating a total of **420 m²** of green roofs and improving their accessibility.

- The mBiGFAVE-1 system was installed at different levels and on different facades with climbing plants and planters. The mBiGFAVE-2 system was installed on part of the EAST façade, with vegetation awnings on the vertical sunshades and climbing plants on the horizontal sunshades. A total of **400.5 m²** of green façade was installed.
- Three types of interventions were carried out outdoors: pergolas with climbing plants and pots (mBiGPEVE 1 and 2 systems), outdoor planting areas with a total surface area of **707.3 m²** and permeable paving (mBiGSUVE 1 and 2) with a total surface area of **456,7 m²**.

The following results have already been obtained in terms of the impact of the NBS in the pilot building:

In the classrooms on the E façade, the average temperature during school hours exceeds the maximum value recommended by RITE for indoor use (27 °C) in both June and September. This is the case before the interventions, but also for the month of June after the interventions. On the other hand, a preliminary analysis shows that the differences between the two facades are reduced (considering that the intervened E façade was the one that suffered the highest temperatures), which could indicate that the mBiGFAVE system would have a positive impact. The W façade is considered the reference façade, as no interventions were carried out on it. However, it should be considered that 2 to 3 more years are needed for the climbing vegetation to reach an adequate development.

Analysing the month of July (there is not enough data for August due to problems with the wifi network when the school is closed) for the roofs, we can also see a reduction in the difference between them, with the temperature being the same throughout the school. This could be related to the effect of the mBiGCUVE roof and its thermal insulation effect in the months when the sun is more perpendicular. The analysis of the hottest months of the school year, June and September, shows that the differences between the facades seem to be reduced. In June, the outside temperatures were higher (24 °C in the intervention compared to a daily average of 22 °C in the previous period), but inside the school, the average temperatures increased by only 0.5 °C in the E façade (26.9 °C before and 27.4 °C after) and the percentage variation between the façades was reduced from 10 % to 6 %. The situation was similar in September. The outside temperatures were 23.4 °C and 22.4 °C respectively. The variation between the facades was reduced from 6.6 % to 2.7 % and the temperatures were 28.6 °C and 26.9 °C, respectively.

- Regarding the temperature of the building envelope, the temperature of the EAST façade is mainly influenced by the mBiGFAVE system, which provides shading. The thermal images show that the surfaces associated with the mBiGFAVE system have a lower surface temperature compared to the surfaces that maintain the original characteristics (Figure 6). This difference is very small, mainly due to the fact that the vegetation has not yet completely covered the structure, which has less effect on the surface temperature.

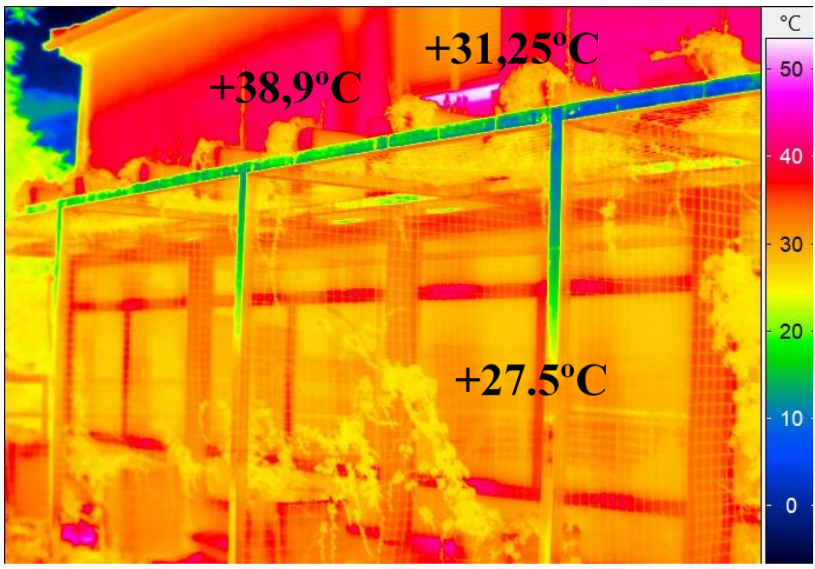


Figure 6. Surface temperatures of the E façade, CEIP Gabriela Mistral

The thermal images show that the green roof surfaces have a lower surface temperature than the original roofs (Figure 7). The difference in temperature is very noticeable, with differences between roof types depending on the type of vegetation and the degree of vegetation cover.

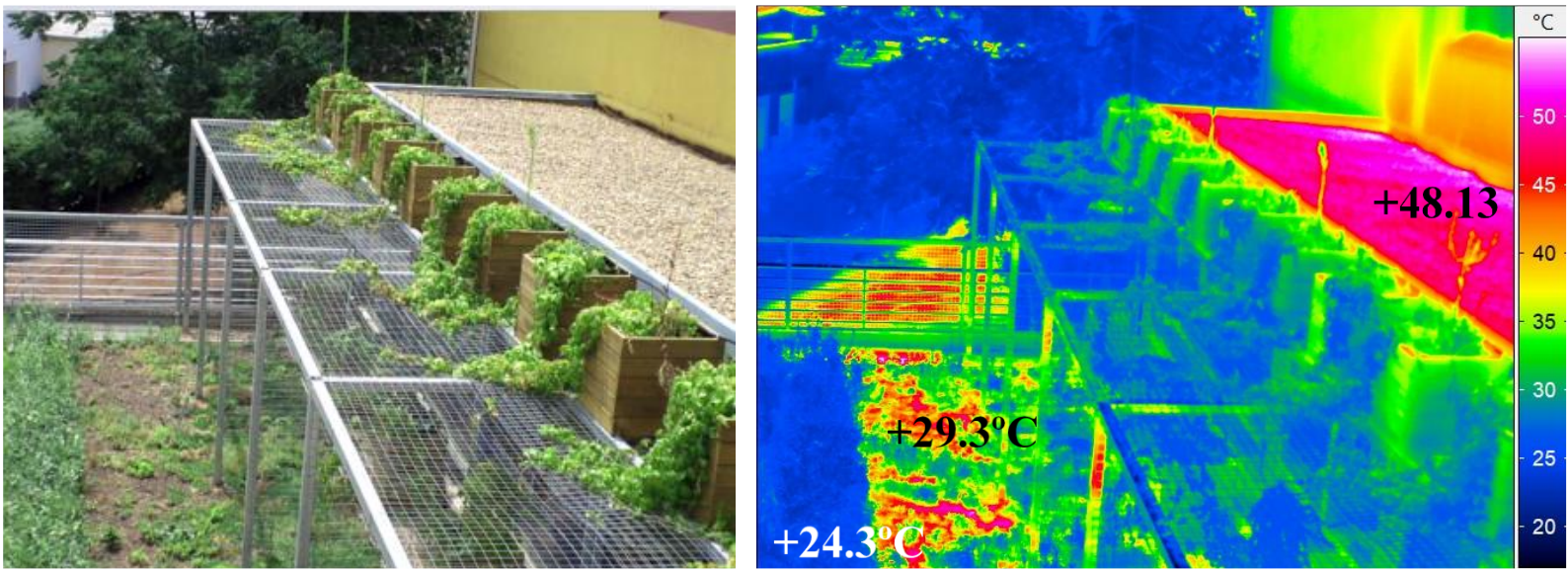


Figure 7. Surface temperatures of the roofs, CEIP Gabriela Mistral

- Rainwater run-off from the roofs without NBS is 13%, whereas after installation of the NBS it is reduced to 3%.
- Although only three surveys were carried out due to COVID-19 restrictions, biodiversity at the Solana de los Barros school shows a significant increase since the installation of the NBS. Further sampling will be required at the end of the project to provide more conclusive data.

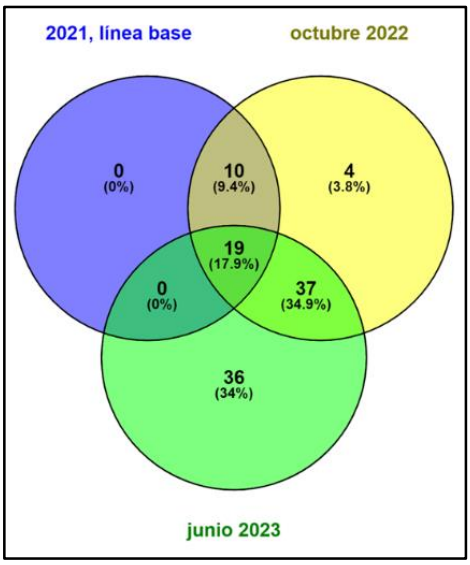


Figure 8. Venn diagram showing species gain, lost and shared among surveys.

The baseline sampling counted 29 species, which increased to 70 immediately after the installation of the NBS, and subsequently increased by a further 36 species.

Analysis of Hill's numbers to estimate the number of observed species (q0), characteristic species (q1, Shannon) and dominant species (q2, Simpson's inverse) indicates that the total number of species estimated for the area is 157 (Figure 8), with this number expected to be reached after ~7 surveys, or ~3 years.

Of particular importance is the increase in populations of several *Armadillidium* species, especially *A. nasatum* Budde-Lund, 1833 (pill bugs, Figure 9), which are detritivores capable of metabolising heavy metals and thus removing them from the substrate.

Ilustración 9. *Armadillidium nasatum*. Photograph: Ilona Loser (Wikipedia, CC BY-SA

- In terms of the number of native plant species, the baseline survey carried out before work began at Solana identified 15 plant species, all of which were ruderal and of little landscape value. During the installation of the NBS, 32 plant species were used, most of which were non-native. The aim was to use hardy species that would require little or no irrigation, but would facilitate the successful establishment of more native plants after a few years, as irrigation would only be used in the first few years to facilitate plant establishment in the early stages of planting. The aim was that these species, selected for their resistance, would act as facilitators for the establishment of native species over time. Indeed, 14 months after planting, the canopies had been **colonised by 16 additional native species**, some of which (e.g. *Medicago* sp, *Trifolium* sp. or *Veronica polita*) cover a considerable area to the detriment of those originally planted.
- Regarding the impact of the NBS and the induced natural ventilation system on the CO_2 concentrations in the building, no clear behaviour can be observed between the pre- and post-intervention periods. In some classrooms CO_2 levels are lower after the intervention and in others they are higher. It should be noted that in some classrooms the concentrations achieved seem to be too high and solutions should be worked on to avoid concentrations above 1000 ppm at any time. With the data collected, it has already been possible to carry out studies on the best time to open the windows in the winter timetable, in order to optimise the ventilation times for air renewal with those of the maximum outside temperature.

Although the CEIP Gabriela Mistral has had more time to measure the project indicators, it is still necessary to carry out the planned measurements on the building for another year after the project completion date and at least three more years of sampling to obtain conclusive data. This is due to the fact that the minimum time required for sampling has not yet been completed and the slow growth of the plant species in the façade solutions, which is being worked on to improve the development of the plants used.

During the After-LIFE period, DIPBA, with the support of CSIC and CARTIF, will be responsible for recording and evaluating the impact of the NBS implemented in the school. The production data collected in the coming years (2024-2025 in detail and 2025-2028 on an ad hoc basis) will be used to assess the impact of the roof and façade solutions.

4. AFTER-LIFE PLAN

The After-LIFE Plan aims to define the way in which the beneficiary partners of the project will continue to measure, disseminate and transfer the results obtained.

As mentioned in previous sections of this document, due to various events during the development of the project, it has not been possible to carry out full monitoring of the pilot buildings where the NBS designed by LIFE-mBiG have been installed. The level of monitoring of these solutions depends on the building: it is practically complete for the school in Solana de los Barros, somewhat less complete for the school in Oporto and is just starting in Évora. Nevertheless, periodic surveys have been carried out to establish the baseline for the three buildings, which is more consistent in the case of Évora due to the long period of monitoring before the solutions were installed. For this reason, the lack of detailed monitoring of the NBS in the pilot buildings is included in this After-LIFE Plan. A more timely monitoring is also included until the end of the After-LIFE period of the project (February 2028), when the behaviour of the NBS will be studied at a more advanced stage of vegetation development.

In addition to this monitoring, the After-LIFE Plan will address issues related to the communication and dissemination of its results, the transferability of its actions and training on the solutions implemented.

Target groups and key stakeholders

During the implementation of the LIFE-mBiG project, the beneficiary partners collaborated with a large number of key organisations and individuals. As a result, a database has been created containing a long list of project stakeholders who have participated in various events and actions and who represent the target groups and key audiences for this After-LIFE Plan. Figure 11 shows a summary of these target groups.

Figure 11. Target groups of the After-LIFE Plan

After-LIFE action programme

The action programme for the After-LIFE period is structured in 4 main blocks: monitoring (M), dissemination and communication (D), transferability and training (T) and coordination and follow-up (CS). The tasks to be carried out in each of these blocks, the estimated dates and the beneficiary partners responsible for their execution are shown below.

Monitoring (M)

1. Completion of the effective monitoring of the NBS installed in CEIP Gabriela Mistral (March - October 2024). Completion of monitoring of indicators that could not be fully assessed during the LIFE-mBiG implementation period. To complete the effective monitoring of the CEIP Gabriela Mistral, the following monitoring is necessary:
   - Measurement of CO_2 indoors and temperature and humidity inside and outside the building. These indicators are measured remotely thanks to the sensors installed in the building by CARTIF during the execution of the LIFE-mBiG project. The measurement of these indicators will continue until the end of the After-LIFE period, with DIPBA guaranteeing their operation and CARTIF carrying out the necessary data analysis to obtain updated results on the effects of the NBS in the pilot building.
   - Calculation of the rainwater captured. These calculations are also carried out remotely by CARTIF. Open climate data is available for this building.
   - Estimation of savings in indoor air conditioning and water consumption for green areas irrigation. DIPBA will record the monthly consumption of electricity, fuel and water bills in a database to be provided by CARTIF, and analyse the long-term savings in indoor air conditioning costs and water consumption after the installation of the NBS.

Deliverable M1: update of the technical monitoring report of the project indicators (Action C3) with the monitoring information described in this action for CEIP Gabriela Mistral (October 2024).

[DIPBA and CARTIF]

2. Completion of the effective monitoring of the NBS implemented in EB1 Falcão (March 2024 - October 2025). Monitoring of indicators that could not be fully assessed during the LIFE-mBiG execution period. To complete the effective monitoring of EB1 Falcão, the following monitoring is necessary:
   - Biodiversity surveys (fall traps and colonising plants) and bioindicator species assessment. RJB-CSIC will travel to Porto to carry out this surveys in June 2025. MP will be in charge of

collecting and sending samples to the Royal Botanical Garden for subsequent identification.

- Measurement of CO_2 indoors and temperature and humidity inside and outside the building. These indicators are measured remotely thanks to the sensors installed in the building by CARTIF during the execution of the LIFE-mBiG project. The measurement of these indicators will continue to be carried out until the end of the After-LIFE period, with MP guaranteeing their operation and CARTIF carrying out the necessary data analysis to obtain updated results on the effects of the NBS in the pilot building.
- Calculation of the rainwater captured. These calculations are also carried out remotely by CARTIF. For this purpose, MP will acquire the necessary data from the *Instituto Português do Mar e da Atmosfera*, as was already done during the execution of the LIFE-mBiG project.
- Estimation of savings in indoor air conditioning and water consumption for green areas irrigation. MP will record the monthly consumption of electricity, fuel and water bills in a database to be provided by CARTIF, and will analyse the long-term savings in indoor air conditioning costs and water consumption after the installation of the NBS.

Deliverable M2: update of the technical monitoring report of the project indicators (Action C3) with the information of the monitoring described in this action for EB1 Falcão (October 2025).

[MP, CARTIF and CSIC]

3. Completion of the effective monitoring of the NBS implemented in EB1 Horta das Figueiras (March 2024 - June 2026). Monitoring of the indicators that could not be assessed during the LIFE-mBiG implementation period. To complete the effective monitoring of EB1 Horta das Figueiras, the following monitoring is necessary:
   - Biodiversity surveys (fall traps and colonising plants) and bioindicator species assessment. RJB-CSIC will travel to Évora to carry out these surveys in June 2025 and 2026. CIMAC will be in charge of collecting and sending the samples to the Royal Botanical Garden for subsequent identification. In order to optimise resources, the surveys will be carried out jointly with the long-term biodiversity surveys programmed in action 4 for the CEIP Gabriela Mistral.
   - Measurement of CO_2 indoors and temperature and humidity inside and outside the building. These indicators are measured remotely thanks to the sensors installed in the building by CARTIF during the execution of the LIFE-mBiG project. The measurement of these indicators will continue to be carried out until the end of the After-LIFE period, with

CIMAC guaranteeing their operation and CARTIF carrying out the necessary data analysis to obtain updated results on the effects of the NBS in the pilot building.

- Calculation of the rainwater captured. These calculations are also carried out remotely by CARTIF. For this, CIMAC will obtain the necessary data provided free of charge by the University of Évora, as was done during the execution of the LIFE-mBiG project.
- Transmittance measurement. The IETcc-CSIC team will travel to EB1 Horta das Figueiras in the summer of 2025 to install a TESTO unit that has an indoor, an outdoor and three surface temperature sensors. This equipment is placed on a roof or façade that has been intervened and another one is placed on another façade or roof without NBS. The equipment measures for 2 to 3 weeks. After the measurement period, the maintenance staff of the school will remove and ship the sensors to the IETcc facilities in Madrid. The results obtained will be compared to conclude about the behaviour of roofs and façades with and without NBS installed.
- Estimation of savings in indoor air conditioning and water consumption for green areas irrigation. CIMAC will record the monthly consumption of electricity, fuel and water bills in a database to be provided by CARTIF, and will analyse the long-term savings in indoor air conditioning costs and water consumption after the installation of the NBS.

Deliverable M3: update of the technical monitoring report of the project indicators (Action C3) with the information of the monitoring described in this action for EB1 Horta das Figueiras (June 2026).

[CIMAC, CARTIF and CSIC]

4. Long-term monitoring of the NBS implemented at CEIP Gabriela Mistral (November 2024 - February 2028). Conduct monitoring to assess how the installed NBS behave in the long term, with more advanced vegetation development. To complete the long-term monitoring at CEIP Gabriela Mistral, the following monitoring is required:
   - Surveys of biodiversity (fall traps and colonising plants) and bioindicator species assessment. RJB-CSIC will travel to Solana de los Barros to carry out these surveys in June 2025, 2026 and 2027. The DIPBA will be in charge of collecting and sending samples to the Royal Botanical Garden for subsequent identification. In order to optimise resources, these surveys will be carried out jointly with the biodiversity surveys programmed in actions 3 and 6 for EB1 Horta das Figueiras.
   - Measurement of CO_2 indoors and temperature and humidity inside and outside the building. Measurements taken and analysed by CARTIF as explained for action 1.

- Calculation of rainwater harvesting. These calculations are carried out by CARTIF as explained for action 1.
- Measurement of envelope temperature and external noise levels. The CARTIF team will make a trip to CEIP Gabriela Mistral in September - October 2027 to check the long term pre- and post-NBS situation.
- Transmittance measurement. The IETcc-CSIC team will travel to CEIP Gabriela Mistral in summer 2027 to carry out this measurement using the same procedure explained in action 3 of this Plan. After the measurement period, the school's maintenance staff will remove and send the sensors to the IETcc facilities in Madrid.
- Estimation of savings in indoor air conditioning and water consumption for green areas irrigation. DIPBA will record the monthly consumption of electricity, fuel and water bills in a database to be provided by CARTIF, and analyse the long-term savings in indoor air conditioning costs and water consumption after the installation of the NBS.

Deliverable M4: update of the technical monitoring report of the project indicators (Action C3) with the information of the long-term monitoring of the NBS implemented in all pilot buildings (February 2028).

[DIPBA, CARTIF and CSIC]

5. Long-term monitoring of the NBS implemented at EB1 Falcão (November 2025 - February 2028). Conduct monitoring to assess how the implemented NBS behave in the long term, with more advanced vegetation development. To complete the long-term monitoring at EB1 Falcão, the following monitoring is necessary:
   - Biodiversity surveys (fall traps and colonising plants) and bioindicator species assessment. RJB-CSIC will travel to Oporto to carry out these surveys in June 2026 and 2027. MP will be in charge of collecting and sending samples to the Royal Botanical Garden for subsequent identification.
   - Measurement of CO_2 indoors and temperature and humidity inside and outside the building. Measurements taken and analysed by CARTIF as explained for action 2.
   - Calculation of rainwater harvesting. These calculations are performed by CARTIF as explained for action 2.
   - Measurement of envelope temperature and external noise levels. The CARTIF team will make a trip to EB1 Falcão in September - October 2027 to check the long term pre- and post-NBS situation.

- Transmittance measurement. The IETcc-CSIC team will travel in summer 2027 to EB1 Falcão to carry out this measurement using the same procedure explained in action 3 of this Plan. After the measurement period, the maintenance staff of the school will remove and ship the sensors to the IETcc facilities in Madrid.
- Estimation of savings in indoor air conditioning and water consumption for green areas irrigation. MP will record the monthly consumption of electricity, fuel and water bills in a database to be provided by CARTIF, and will analyse the long-term savings in indoor air conditioning costs and water consumption after the installation of the NBS.

Deliverable M4: update of the technical monitoring report of the project indicators (Action C3) with the information of the long-term monitoring of the NBS implemented in all pilot buildings (February 2028).

[MP, CARTIF and CSIC]

6. Long-term monitoring of the NBS installed at EB1 Horta das Figueiras (July 2026 - February 2028). Carrying out monitoring to assess how the implemented NBS behave in the long term, with more advanced vegetation development. To complete the long-term monitoring at BS1 Horta das Figueiras, the following monitoring is necessary:
   - Biodiversity surveys (fall traps and colonising plants) and bioindicator species assessment. RJB-CSIC will travel to Évora to carry out this surveys in June 2027. CIMAC will be in charge of collecting and sending samples to the Royal Botanical Garden for subsequent identification.
   - Measurement of CO_2 indoors and temperature and humidity inside and outside the building. Measurements taken and analysed by CARTIF as explained for action 3.
   - Calculation of rainwater harvesting. These calculations are performed by CARTIF as explained for action 3.
   - Measurement of envelope temperature and external noise levels. The CARTIF team will make a trip to EB1 Horta das Figueiras in September - October 2027 to check the long term pre- and post-NBS situation.
   - Transmittance measurement. The IETcc-CSIC team will travel in summer 2027 to EB1 Horta das Figueiras to carry out this measurement using the same procedure explained in action 3 of this Plan. After the measurement period, the maintenance staff of the school will remove and ship the sensors to the IETcc facilities in Madrid.
   - Estimation of savings in indoor air conditioning and water consumption for green areas irrigation. CIMAC will record the monthly consumption of electricity, fuel and water bills

in a database to be provided by CARTIF, and will analyse the long-term savings in indoor air conditioning costs and water consumption after the installation of the NBS.

Deliverable M4: update of the technical monitoring report of the project indicators (Action C3) with the information of the long-term monitoring of the NBS implemented in all pilot buildings (February 2028).

[CIMAC, CARTIF and CSIC]

Dissemination and communication (D)

7. Maintenance and continuous enrichment of the infrastructure and communication channels established during the implementation of LIFE-mBiG (March 2024 - February 2028). Updating of the project website during the five years after the end of the project. At least 5 annual news from each partner and 4 technical documents per partner will be published in the After-LIFE period, communicating the new results obtained.

   The news content will cover possible organised visits to the NBS of each pilot building, scheduled demonstration workshops, training workshops on climate adaptation with school students, various sampling activities carried out, as well as image updates on the evolution of the NBS in the After-LIFE period.

   The content of the technical documents will be related to the results of new measurements of the project indicators, the impact of the communication and transferability actions (number of visits and workshops, number and profile of participants, increase of visits and total users of the project's communication channels, sending of documentation to interested persons and organisations, etc.), progress achieved in the field of governance, etc.

   At the end of the After-LIFE period, the website will no longer be updated, but will remain operational for consultation, hosted as a section in each of the institutional websites of the beneficiary entities of the project.

   In addition to the project website, the project communication channels (X, LinkedIn and YouTube) and the eLearning platform created by LIFE-mBiG will continue to be used and updated. This platform will continue to be available after the After-LIFE period, as RJB-CSIC will continue to use it to host new online training courses on aspects related to the LIFE-mBiG project. Similarly, the dissemination channels LinkedIn and X (formerly Twitter) will remain operational after the end of the After-LIFE period, as they will be re-used by other LIFE-mBiG related projects in which RJB-CSIC participates. Thus, the community created during the After-LIFE period of LIFE-mBiG will not be lost. An example of a project that will continue part of the legacy of LIFE-mBiG is the PAULIA project, in which the CSIC participates and which, among

other things, will study the impact of NBS vegetation in public spaces as a solution to mitigate heat waves. This project has a duration of three years from November 2023 and is funded by the National Research Agency (AEI).

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CSIC, MP, CIMAC, DIPBA and CARTIF]

8. Dissemination of training and dissemination materials created by LIFE-mBiG (March 2024 - February 2028). Realisation of new editions of the exhibition on the LIFE-mBiG project prepared by MP in different locations in the municipality of Porto and neighbouring cities, delivery of surplus printed brochures on LIFE-mBiG that will be available in the offices of the beneficiary entities of the project, as well as sending the LIFE-mBiG Climate Adaptation Package (Action C6) to new key entities for capacity building. Part of the surplus dissemination materials from the LIFE-mBiG project will be delivered to the PAULIA project, described in the previous action, and to the CREALAB PINTO project, described in Action 12 of this Plan.

   In addition to the materials mentioned in the previous paragraph, the necessary extended information required by any person interested in LIFE-mBiG, which is not available in the results section of the project website or in any of its communication channels, will be provided.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CSIC, MP, CIMAC and DIPBA]

9. Raising awareness and promoting greater knowledge of NBS among the school community in the three pilot buildings (March 2024 - February 2028). Continuation of the educational programmes and training activities developed specifically for the school community in each of the three pilot buildings of the project.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[MP, CIMAC and DIPBA]

10. Update of the LIFE-mBiG information in the Climate-ADAPT platform (March 2024 - February 2028). Update of the case study of the NBS installation project in Solana de los Barros, uploaded to the Climate-ADAPT platform, to include any new results obtained during the After-LIFE period. Two new case studies of the Oporto and Évora construction projects will

also be published, once the final results of the effective monitoring of the NBS implemented in both cases are available.

In addition to the update on Climate-ADAPT, CSIC, as project coordinator, will update information about the project on other platforms where the project is present, such as the European Committee of the Regions or the Spanish National Observatory for Nature-based Solutions.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CSIC]

11. Holding of an information day on the final results of LIFE-mBiG (October 2027 - February 2028). In the last months of the After-LIFE period, after having obtained the final results of all the long-term monitoring, the RJB-CSIC will organise a short information day at its facilities to communicate the results obtained five years after the end of the project. This event will be broadcast in *streaming to* reach a wider audience.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CSIC]

Transferability and training (T)

12. Organisation of on-site demonstration workshops in the 3 pilot buildings with optimal vegetation development (November 2024 - February 2028). Carrying out at least two demonstration workshops per partner in each of its pilot buildings. These workshops will show the installed NBS and explain the process for replication in other buildings. These events can be addressed to technical staff from the same entity or from other entities interested in the use of this type of solutions.

Deliverable T1: Demonstration workshop programmes (February 2028)

[MP, CIMAC and DIPBA]

13. Demonstration workshops through the RJB-CSIC Gardening Employment Workshop and the CREALAB PINTO project (September 2024 - February 2028). Once the period of effective monitoring of the NBS in the three pilot buildings has concluded (July 2026), the RJB-CSIC will organise at least two workshops with the students of the Gardening Employment Workshop of the Royal Botanical Garden to demonstrate the technical aspects of the NBS installed by

LIFE-mBiG. This will improve the knowledge of new generations of gardeners and landscapers on the use of NBS to improve thermal comfort in buildings.

In addition, it is possible to include LIFE-mBiG training content in various workshops that will be organised in the framework of the CREALAB PINTO project, in which experts from the IETcc-CSIC are participating. This project, led by the Polytechnic University of Madrid, proposes the application of NBS in a classroom for workshops in an educational centre in the city of Pinto (Madrid). An extension of the project has been requested which, if granted, will allow this collaboration to improve the impact of the After-LIFE Plan.

Deliverable T1: Demonstration workshop programmes (February 2028)

[CSIC]

14. Knowledge transfer to SMEs in the technological, environmental and climate sector (July 2026 - February 2028). Advantage will be taken of the large number of SMEs with which the CARTIF Technology Centre and the Eduardo Torroja Institute of Construction Sciences (IETcc-CSIC) work to share the final results of the various monitoring projects to be carried out during the After-LIFE period. This transfer of results will be carried out through the various projects and collaborations that CARTIF and IETcc-CSIC currently have in place with this type of entities, as well as through communications through the media of both entities, such as blogs, conferences, etc. In Portugal, the network of contacts with SMEs of the National Association of Green Roofs (ANCV), which closely followed the project, will also be used to mobilise the transferability of knowledge. MP will be the facilitator of this transfer, which will also take place through ongoing projects and examples at technical events.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CARTIF, MP and CSIC]

15. Training and technical assistance to municipalities, SMEs, local development actors and NGOs within the scope of DIPBA and MP (November 2025 - February 2028). Based on their experience in the implementation of the project's NBS, DIPBA and the MP will provide training and technical assistance to municipalities, SMEs, local development agents and NGOs in their field of action. In addition, as far as possible, the plant material available in the nurseries of both beneficiary entities will be used for transferability actions of the NBS installed by LIFE-mBiG.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[DIPBA and MP]

16. Knowledge transfer from MP to the associations of municipalities and regional, national and European networks in which it participates (November 2025 - February 2028). MP will collaborate with the National Green Roof Association (ANCV) and its European network (*European Federation of Green Roof Associations*, EFB) and international networks (*World Wide Infrastrcuture Network*, WGIN). MP will take advantage of its participation in EUROCITIES, a network in which it has held the Vice-Presidency of the Environment Forum, to give visibility to the initiatives and tasks of the project, improving the transferability options of the NBS implemented in the framework of LIFE-mBiG and in other European projects in which the entity participates. MP will also take advantage of its participation in other networks, associations and initiatives (international, national and regional) that share the concern for environmental sustainability to publicise its experience with LIFE-mBiG, such as: Ellen McArthur Foundation - Cities and Circular Economy for Food; Global Covenant of Mayors for Climate and Energy; *Carbon Disclosure Project - CDP*; *Green City Agreement*; and Porto Climate Pact.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[MP]

17. Exchange of information with entities identified in the governance (C4) and transferability (C5) actions (July 2026 - February 2028). During the course of the project, the beneficiary partners have interacted and collaborated with many entities whose lines of work are related to the LIFE-mBiG theme. Some of these entities are Green Building Council España (GBCe), Fundación CONAMA, Asociación Española de Cubiertas Verdes y Ajardinamientos Verticales (ASESCUVE), Asociación Nacional de Cubiertas Verdes (ANCV), SBNCLIMA S.L., Federación Española de Municipios y Provincias (FEMP), Plataforma de Colaboración para la Neutralidad Climática de las Ciudades Españolas, Red CLIMA, Red +BIODIVERSIDAD, European Committee of the Regions, or the projects LIFE-EcoDigestion 2.0 and LIFE RESYTAL. In order to improve the information handled by these entities on LIFE-mBiG and to be able to reinforce the collaborations of the beneficiary partners with the identified entities, any updated technical report will be sent with the latest results obtained from the After-LIFE monitoring process and the possible existing collaboration channels will be explored.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CSIC, CARTIF, DIPBA, MP and CIMAC]

18. Inclusion of LIFE-mBiG NBS in the Online Catalogue of Building Solutions (October 2027 - February 2028). Once the complete monitoring of the After-LIFE period has been carried out, the IETcc-CSIC will try again to include the NBS of the project in the Online Catalogue of Construction Solutions (COSC) of the Spanish technical building code (CTE) so that they are available for their use and replicability. Following the recommendations of the CTE technicians, to include the NBS in the CTE it would be necessary to replicate the NBS in other contexts beyond the field of educational and social buildings, and to check how this type of solutions behaves to improve thermal comfort. For this reason, it is possible that after the After-LIFE period the inclusion of the LIFE-mBiG NBS in the CTE will not yet be achieved, however, communications will be resumed to enable their inclusion in the future.

    In addition, experts from IETcc-CSIC have held meetings with members of the company Singular Green to study the thermal transmittance parameter in enclosures with the application of NBS and to be able to connect the results with the COSC.

Deliverable T2: report on governance measures addressed during the After-LIFE period and their main results (February 2028)

[CSIC]

19. Inclusion of the project results in five agreements and five multi-annual regulations and programmes (July 2026 - February 2028). The beneficiary entities that are local and/or regional authorities will work in the After-LIFE period to include the final results of the project in various local and/or regional multiannual regulations and programmes that allow the long-term transferability of the NBS implemented by LIFE-mBiG. The deliverable of this action will include what has been achieved during the After-LIFE period in relation to governance, indicating achievements and failed attempts and their reasons.

Deliverable T2: report on governance measures addressed during the After-LIFE period and their main results (February 2028)

[CIMAC, DIPBA and MP]

20. Contact with new LIFE projects approved in 2024, 2025 and 2026 (March 2024 - February 2028). The LIFE-mBiG coordination will contact the new projects approved in the 2024, 2025 and 2026 calls for Climate Action of the LIFE programme whose themes are related to

buildings and their adaptation to climate change. The purpose of this contact will be to provide all the information on the LIFE-mBiG project and its final results, as well as to discuss possible collaborations with the new approved projects.

Deliverable DT1: compilation report of communication and transferability activities of the After-LIFE period (February 2028)

[CSIC]

Coordination and Monitoring (CS)

21. Coordination and monitoring of compliance with the actions of the After-LIFE Plan (March 2024 - February 2028). To ensure compliance with the actions proposed in this After-LIFE Plan, the CSIC, through the Royal Botanical Garden (RJB-CSIC), will be in charge of monitoring the Plan. To this end, annual virtual meetings will be organised with the project partners to see the degree of compliance with their actions, possible deviations from the deadlines set and the solutions proposed to meet the committed objectives. During these meetings, the information generated during the current year will be compiled to complete the deliverables to be published in the After-LIFE period. These meetings will be held in the weeks prior to the summer period, as the bulk of the monitoring must be carried out between May and September, to avoid possible deviations in the deadlines remaining unresolved. In addition, a joint virtual meeting will be held with all partners in January 2028 to make a joint evaluation of the entire After-LIFE period.

Deliverable CS1: Update of the final report of the project with the information collected during the After-LIFE period.

[CSIC]

Timeline, budget and distribution of tasks of the After-LIFE Plan

	NO.	Actions	When	Where	Who	Financial need	Sources of funding	Priority	Deliverable
Monitoring (M)	1	Effective NBS monitoring at CEIP Gabriela Mistral	6 months after project end date (Mar - Oct 2024)	Badajoz	DIPBA CARTIF	€	In-house funds	***	M1
	2	Effective monitoring of NBS in EB1 Falcão	18 months after project end date (Mar 2024 - Oct 2025)	Porto	MP CSIC CARTIF	€€	In-house funds	***	M2
	3	Effective monitoring of NBS at EB1 Horta das Figueiras	24 months after project end date, including the spring of the last year (Mar 2024 - Jun 2026).	Évora	CIMAC CSIC CARTIF	€€€	In-house funds	***	M3
	4	Long-term monitoring at CEIP Gabriela Mistral	After the effective monitoring of NBS (Jul 2026 - Feb 2028)	Badajoz	DIPBA CSIC CARTIF	€€	In-house funds	***	M4
	5	Long-term monitoring at EB1 Falcão	After effective monitoring of NBS (Nov 2025 - Feb 2028)	Porto	MP CSIC CARTIF	€€	In-house funds	***	M4
	6	Long-term monitoring at EB1 Horta das Figueiras	After the effective monitoring of NBS (Jul 2026 - Feb 2028)	Évora	CIMAC CSIC CARTIF	€€	In-house funds	***	M4
Dissemination (D)	7	Maintenance of communication channels	Throughout the After-LIFE period (Mar 2024 - Feb 2028)	Online	ALL	€€	In-house funds PAULIA Project	***	DT1
	8	Dissemination of training and informative materials	Throughout the After-LIFE period, focusing on the initial phase when materials are still available.	Madrid Porto Évora Badajoz	CSIC MP CIMAC DIPBA	€€	In-house funds PAULIA Project CREALAB PINTO Project	**	DT1
	9	Raising awareness in the school community	Throughout the After-LIFE period (Mar 2024 - Feb 2028)	Porto Évora Badajoz	MP CIMAC DIPBA	€	In-house funds	**	DT1
	10	Climate-ADAPT platform update	Throughout the After-LIFE period, with emphasis on the final phase when final results will be obtained.	Online	CSIC	€	In-house funds	**	DT1

Caption:
Financial need: € = up to 5.000 euros; € = between 5.000 and 10.000 euros; € = between 10.000 and 50.000 euros
Priority: *** = the action is absolutely necessary to achieve the objectives of the After-LIFE Plan; ** = the implementation of this action represents a considerable improvement of the scope and efficiency of the project; * = this action might not be implemented in case of financial problems.

	NO.	Actions	When, how often	Where	Who	Financial need	Sources of funding	Priority	Deliverable
Transferability and training (T)	11	Information day on final results	Following long-term monitoring results (Oct 2027 - Feb 2028)	Madrid	CSIC	€€	In-house funds	**	DT1
	12	Organisation of on-site demonstration workshops	Following the final results of DIPBA (Nov 2024 - Feb 2028)	Porto Évora Badajoz	MP CIMAC DIPBA	€€	In-house funds Synergies with other projects	**	T1
	13	Workshops at the RJB-CSIC and CREALAB PINTO Employment Workshops	After final monitoring results are obtained (Sep 2024 - Feb 2028)	Madrid	CSIC	€€	In-house funds Community of Madrid Funds CREALAB PINTO Project	***	T1
	14	Transferring knowledge to technology SMEs	After final monitoring results are obtained (Jul 2026 - Feb 2028)	Valladolid Porto Madrid	CARTIF MP CSIC	€	In-house funds PAULIA Project	**	DT1
	15	Training and technical assistance at local level	After final MP results are obtained (Nov 2025 - Feb 2028)	Badajoz Porto	DIPBA MP	€€€	In-house funds	***	DT1
	16	Transfer knowledge in MP networks	After final MP results are obtained (Nov 2025 - Feb 2028)	Porto	MP	€	In-house funds	**	DT1
	17	Reporting to governance and transferability bodies	After final monitoring results are obtained (Jul 2026 - Feb 2028)	Spain Portugal	ALL	€	In-house funds PAULIA Project	**	DT1
	18	Inclusion of NBS in Building Solutions Catalogue	After long-term monitoring results are obtained (Oct 2027 - Feb 2028)	Madrid	CSIC	€€	In-house funds IDAE Funds	*	T2
	19	Inclusion of mBiG results in agreements and regulations	After final monitoring results are obtained (Jul 2026 - Feb 2028)	Évora Badajoz Porto	CIMAC DIPBA MP	€	In-house funds Local authority funds	***	T2
	20	Contact with new approved LIFE projects	Following the publication of the 2024, 2025 and 2026 Call Resolutions	Online	CSIC	€	In-house funds	**	DT1
CS	21	Coordination and monitoring of the After-LIFE Plan	Throughout the After-LIFE period (Mar 2024 - Feb 2028)	Online	CSIC	€	In-house funds	***	CS1

Caption:
Financial need: € = up to 5.000 euros; € = between 5.000 and 10.000 euros; € = between 10.000 and 50.000 euros
Priority: *** = the action is absolutely necessary to achieve the objectives of the After-LIFE Plan; ** = this action represents a considerable improvement of the scope and efficiency of the project; * = this action might not be implemented in case of financial problems.

Persons in charge of the implementation of the After-LIFE Plan

The success of the After-LIFE Plan depends to a large extent on the responsible team assigned to implement the actions included in this document. The dedicated staff must meet at least two criteria: a) to have been involved in the implementation period of the LIFE-mBiG project and b) to be permanent staff of the beneficiary institutions participating in the project.

At the beginning of the LIFE-mBiG project, some of the staff of the educational centres where the project intervenes were reluctant to implement NBS in their centres, sometimes questioning the positive effects of the implemented NBS. During the execution of the project these people became aware of the advantages of this type of solution and have now become key allies and ambassadors in amplifying the impacts of the LIFE-mBiG project. Therefore, in addition to the people directly involved in the implementation of the After-LIFE Plan, we consider it vital to have the collaboration of people from these schools to act as points of contact and facilitators of the actions that take place in their pilot buildings.

Below is a list of the people in charge of coordinating the Plan's actions, as well as the contact persons in the schools, describing why they are the most appropriate people to ensure its success.

Jesús Muñoz (RJB-CSIC)

Senior Researcher at the Royal Botanical Garden, he has been the Principal Investigator of LIFE-mBiG since its inception. He is the person who will coordinate the actions of the After-LIFE Plan and will lead those that fall mainly on the RJB-CSIC team, such as actions 1-8, 10-11, 13-14, 17 and 20-21.

Borja Frutos (IETcc-CSIC)

Staff architect at the Instituto de Ciencias de la Construcción Eduardo Torroja, he has been the main technical point of contact for the LIFE-mBiG project since its inception. He is the person who will be the driving force behind those actions of the After-LIFE Plan that fall mainly on the IETcc-CSIC team, such as actions 1-7, 14 and 17-18.

Raquel Marijuan (CARTIF)

She has been one of the people most involved in the monitoring process of the indicators of the LIFE-mBiG project, so her inclusion in the After-LIFE Plan is of great relevance for the correct fulfilment of the monitoring actions, whose execution priority is high (***). Raquel will be in charge of those actions that fall mainly on the CARTIF team, such as actions 1-7, 14 and 17.

Miguel Ángel Antón (DIPBA)

Staff architect of the Provincial Council of Badajoz, he has been the reference person of this beneficiary entity from the beginning of the project and has been fully involved in the design and execution of the construction project in the pilot building of Solana de los Barros (Badajoz, Spain). His inclusion in the After-LIFE Plan is of great relevance for the correct fulfilment of the long-term monitoring actions in the Solana de los Barros building. Miguel Ángel will be in charge of those actions that fall mainly on the DIPBA team, such as actions 1, 4, 7-9, 12, 15, 17 and 19.

Antonia Montevirgen (CEIP Gabriela Mistral)

Director of the CEIP Gabriela Mistral, which is the pilot building in Solana de los Barros, has been involved since the beginning of the project in the execution of the construction project in this building, as well as in the monitoring and communication tasks related to her school. Antonia will not be directly involved in the implementation of the After-LIFE Plan, although she will act as a contact point and facilitator of the actions of the Plan to be physically implemented in the CEIP Gabriela Mistral, such as actions 1, 4, 8-9 and 12.

Marta Pinto (MP)

Municipal Technician in the Municipality of Oporto, she has been the reference person of this beneficiary entity in the last phase of the project, although she has been present in the project since its beginning. Marta has been the person responsible for dynamising the team of the Municipality of Porto in the different actions of the project, obtaining very satisfactory results, so her inclusion in the After-LIFE Plan will guarantee the correct fulfilment of the monitoring and other actions for the Porto building. Specifically, Marta will be the driving force behind those actions that fall mainly on the PM team, such as actions 2, 5, 7-9, 12, 14-17 and 19.

Helena Ribeiro (EB1 Falcão)

Principal of EB1 Falcão, which is the pilot building in Porto, she has been involved since the beginning of the project in the implementation of the construction project in this building, as well as in the monitoring and communication tasks related to her school. Helena will not be directly involved in the implementation of the After-LIFE Plan, although she will act as a contact point and facilitator for the actions of the Plan to be physically implemented in EB1 Falcão, such as actions 2, 5, 8-9 and 12.

João Sardinha (CIMAC)

Head of the Multidisciplinary Team of the Environment and Development Unit in the Intermunicipal Community of Central Alentejo, he has been the reference person of this beneficiary entity in the last phase of the project. João has been the person responsible for energising the CIMAC team in the various actions of the project, obtaining very satisfactory results, so that his inclusion in the After-LIFE Plan will guarantee the correct fulfilment of the monitoring and other actions for the Évora building. In particular, João will be in charge of those actions that fall mainly on the CIMAC team, such as actions 3, 6, 7-9, 12, 17 and 19.

Ana Isabel Trigacheiro Pires Fernandes (EB1 Horta das Figueiras)

Director of the Severim de Faria School Grouping, Évora, which includes EB1 Horta das Figueiras, a pilot building in Évora. She has been involved since the beginning of the project in the execution of the construction project in this building, as well as in the monitoring and communication tasks concerning her school. Ana Isabel will not be directly involved in the implementation of the After-LIFE Plan, although she will act as a contact point and facilitator of the actions of the Plan to be physically implemented in EB1 Horta das Figueiras, such as actions 3, 6, 8-9 and 12.

Sustainability of project results after the After-LIFE period

The sustainability of the actions and results of the project has a long-term vision, going beyond the five-year time horizon of this After-LIFE Plan.

The NBS implemented in each building will be part of the municipal and provincial public green infrastructure equipment. For this reason, DIPBA, CIMAC and MP will involve technical and financial resources and efforts to maintain the NBS in optimal conditions once the project is completed.

Innovative materials and techniques used in the development of the prototypes will be key factors in:

a) significantly reduce the operating costs of the NBS in each building;

b) maintain the functionality of the NBS as a climate adaptation solution in the pilot buildings;

c) maintain environmental and climatic coherence with the environment in which the buildings are located.

Also, the promotion of communication networks and citizen participation related to climate adaptation in a local setting will sustain the results of the project actions, as it will be the citizens who will work to replace the materials and technical aspects of the project.

After 5 years, the proposed solutions for the buildings and the models implemented to adapt them to climate change will be mature enough to allow the demonstrated benefits to act as the main driver for the dissemination of the project results. It is in the interest of the partners to continue to disseminate the results after the end of the project and even after the five years of the After-LIFE Plan.

It is expected that the pilot schools will increasingly become spaces for raising awareness, demonstrating and inspiring sustainability.

The partners are convinced of the great potential to replicate the NBS of the project in other public buildings (not only educational, but also social or other), promoting their adaptation to climate change under the premises of bioclimatic comfort, efficiency and sustainability, and increasing biodiversity and ecosystem services in the urban environment.

Strategic guidance at European level, and consequently in the Member States, will also support the transfer and replication of LIFE-myBUILDINGisGREEN results. Resource sustainability, decarbonisation, adaptation to climate change and the adoption of nature-based solutions have become a growing priority and ambitious targets have been set in this area.

Project web page: https://life-mybuildingisgreen.eu/en/home/

X/Twitter: buildingisgreen (#LIFEmBiG)

LinkedIn: https://www.linkedin.com/company/28944174

YouTube: https://www.youtube.com/@lifemybuildingisgreen6359